

# **SNx4HC08 Quadruple 2-Input AND Gates**

#### 1 Features

- **Buffered inputs**
- Wide operating voltage range: 2V to 6V
- Wide operating temperature range: -40°C to +85°C
- Supports fanout up to 10 LSTTL loads
- Significant power reduction compared to LSTTL logic ICs

## 2 Applications

- Combining power good signals
- Enable digital signals

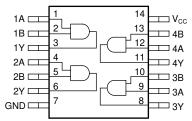
### 3 Description

This device contains four independent 2-input AND gates. Each gate performs the Boolean function  $Y = A \bullet B$  in positive logic.

#### **Device Information**

PART NUMBER	PACKAGE <sup>(1)</sup>	PACKAGE SIZE(1)	BODY SIZE(1)
	D (SOIC, 14)	8.65mm x 6mm	8.65mm × 3.90mm
	DB (SSOP, 14)	6.2mm x 7.8mm	6.2mm × 5.30mm
SN74HC08	N (PDIP, 14)	19.3mm x 9.4mm	19.30mm × 6.40mm
	NS (SOP, 14)	10.2mm x 7.8mm	10.20mm × 5.30mm
	PW (TSSOP, 14)	5mm x 6.4mm	5.00mm × 4.40mm
	FK (LCCC, 20)	8.90mm × 8.90mm	8.90 mm × 8.90 mm
SN54HC08	J (CDIP, 14)	19.55mm x 7.9mm	19.55mm x 6.7mm
	W (CFP, 14)	9.21mm x 9mm	9.21mm × 6.3mm

- For more information, see Section 11.
- The package size (length × width) is a nominal value and includes pins, where applicable.
- The body size (length × width) is a nominal value and does not include pins.



**Functional Pinout** 

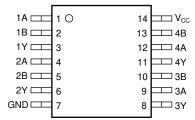


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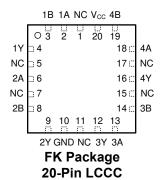
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## **4 Pin Configuration and Functions**



D, DB, N, PW, J, or W Package 14-Pin SOIC, SSOP, PDIP, TSSOP, CDIP, or CFP Top View



**Top View** 

#### **Pin Functions**

	PIN			
NAME	D, DB, N, PW, J, or W	FK	I/O	DESCRIPTION
1A	1	2	Input	Channel 1, Input A
1B	2	3	Input	Channel 1, Input B
1Y	3	4	Output	Channel 1, Output Y
2A	4	6	Input	Channel 2, Input A
2B	5	8	Input	Channel 2, Input B
2Y	6	9	Output	Channel 2, Output Y
GND	7	10	_	Ground
3Y	8	12	Output	Channel 3, Output Y
3A	9	13	Input	Channel 3, Input A
3B	10	14	Input	Channel 3, Input B
4Y	11	16	Output	Channel 4, Output Y
4A	12	18	Input	Channel 4, Input A
4B	13	19	Input	Channel 4, Input B
V <sub>CC</sub>	14	20	_	Positive Supply
NC		1, 5, 7, 11, 15, 17	_	Not internally connected

## **5 Specifications**

### 5.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)(1)

			MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage		-0.5	7	V
I <sub>IK</sub>	Input clamp current <sup>(2)</sup>	$V_I < 0$ or $V_I > V_{CC}$		±20	mA
I <sub>OK</sub>	Output clamp current <sup>(2)</sup>	V <sub>O</sub> < 0		±20	mA
Io	Continuous output current	$V_{O} = 0$ to $V_{CC}$		±25	mA
	Continuous current through V <sub>CC</sub> or GND			±50	mA
TJ	Junction temperature <sup>(3)</sup>			150	°C
T <sub>stg</sub>	Storage temperature		-60	150	°C

- (1) Stresses beyond those listed under Absolute Maximum Rating may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Condition. Exposure to absolute-maximum-rated conditions for extended periods may affect device
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
- Guaranteed by design.

#### 5.2 ESD Ratings

			VALUE	UNIT
V	Electrostatic discharge	Human-body model (HBM), per ANSI/ESDA/ JEDEC JS-001 <sup>(1)</sup>	±2000	V
V(ESD)	Lieurostano disoriarge	Charged-device model (CDM), per JEDEC specification JESD22-C101 <sup>(2)</sup>	±1000	V

- JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
- (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

#### 5.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)1

			MIN	NOM	MAX	UNIT
V <sub>CC</sub>	Supply voltage	·	2	5	6	V
		V <sub>CC</sub> = 2 V	1.5			
V <sub>IH</sub>	High-level input voltage	V <sub>CC</sub> = 4.5 V	3.15			V
		V <sub>CC</sub> = 6 V	4.2			
		V <sub>CC</sub> = 2 V			0.5	
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 4.5 V			1.35	V
		V <sub>CC</sub> = 6 V			1.8	
VI	Input voltage	·	0		V <sub>CC</sub>	V
Vo	Output voltage		0		V <sub>CC</sub>	V
		V <sub>CC</sub> = 2 V			1000	
Δt/Δν	Input transition rise and fall rate	V <sub>CC</sub> = 4.5 V			500	ns
		V <sub>CC</sub> = 6 V			400	
_	Operating free air temperature	SN54HC08	-55		125	°C
T <sub>A</sub>	perating free-air temperature	SN74HC08	-55		125	C

1. All unused inputs of the device must be held at VCC or GND to ensure proper device operation. See Implications of Slow or Floating CMOS Inputs, .

Product Folder Links: SN74HC08 SN54HC08



### **5.4 Thermal Information**

				SN74HC08			
	THERMAL METRIC <sup>(1)</sup>	D (SOIC)	DB (SSOP)	N (CFP)	NS (SO)	PW (TSSOP)	UNIT
		14 PINS	14 PINS	14 PINS	14 PINS	14 PINS	
$R_{\theta JA}$	Junction-to-ambient thermal resistance	133.6	113.1	66.0	122.6	151.7	°C/W
R <sub>θ</sub> JC(top)	Junction-to-case (top) thermal resistance	89	62.8	53.7	81.8	79.4	°C/W
R <sub>0JB</sub>	Junction-to-board thermal resistance	89.5	63.4	45.7	83.8	94.7	°C/W
$\Psi_{JT}$	Junction-to-top characterization parameter	45.5	22.3	33.3	45.4	25.2	°C/W
$\Psi_{JB}$	Junction-to-board characterization parameter	89.1	62.7	45.5	83.4	94.1	°C/W
R <sub>θ</sub> JC(bot)	Junction-to-case (bottom) thermal resistance	N/A	N/A	N/A	N/A	N/A	°C/W

<sup>(1)</sup> For more information about traditional and new thermal metrics, see the Semiconductor and IC Package Thermal Metrics application report.

### **5.5 Electrical Characteristics - 74**

over operating free-air temperature range; typical values measured at  $T_A = 25$ °C (unless otherwise noted).

							Opera	ting free-	air tem	peratur	e (T <sub>A</sub> )			
ı	PARAMETER	TEST CO	NDITIONS	V <sub>CC</sub>		25°C		–40°	C to 85°	,C	-55°C	C to 125	°C	UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
				2 V	1.9	1.998		1.9			1.9			
			I <sub>OH</sub> = -20 μΑ	4.5 V	4.4	4.499		4.4			4.4			
	High-level	$V_{I} = V_{IH}$ or $V_{IL}$	1	6 V	5.9	5.999		5.9			5.9			
V <sub>OH</sub>	Output voltage		I <sub>OH</sub> = -4 mA	4.5 V	3.98	4.3		3.84			3.7			V
			I <sub>OH</sub> = -5.2 mA	6 V	5.48	5.8		5.34			5.2			
			I <sub>OL</sub> = 20 μΑ	2 V		0.002	0.1			0.1			0.1	
				4.5 V		0.001	0.1			0.1			0.1	
V <sub>OL</sub>	Low-level output			6 V		0.001	0.1			0.1			0.1	V
· OL	voltage	V <sub>IL</sub>	I <sub>OL</sub> = 4 mA	4.5 V		0.17	0.26			0.33			0.4	v
			I <sub>OL</sub> = 5.2 mA	6 V		0.15	0.26			0.33			0.4	
I <sub>I</sub>	Input leakage current	age $V_I = V_{CC}$ or 0		6 V			±0.1			±1			±1	μΑ
I <sub>CC</sub>	Supply current	V <sub>I</sub> = V <sub>CC</sub> or 0	I <sub>O</sub> = 0	6 V			2			20			40	μΑ
Ci	Input capacitance			2 V to 6 V		3	10			10			10	pF

### 5.6 Electrical Characteristics - 54

over operating free-air temperature range; typical values measured at TA = 25°C (unless otherwise noted).

			<u> </u>				Opera	ting free-	air tem	peratur	e (T <sub>A</sub> )	,		
ı	PARAMETER	TEST CO	NDITIONS	V <sub>cc</sub>		25°C		–40°	C to 85	°C	–55°0	C to 125	°C	UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
				2 V	1.9	1.998		1.9			1.9			
			I <sub>OH</sub> = –20 μΑ	4.5 V	4.4	4.499		4.4			4.4			
	  High-level	V <sub>I</sub> = V <sub>IH</sub> or	F., .	6 V	5.9	5.999		5.9			5.9			
V <sub>OH</sub>		V <sub>IL</sub>	I <sub>OH</sub> = -4 mA	4.5 V	3.98	4.3		3.84			3.7			V
			I <sub>OH</sub> = -5.2 mA	6 V	5.48	5.8		5.34			5.2			
		I,	I <sub>OL</sub> = 20 μΑ	2 V		0.002	0.1			0.1			0.1	
				4.5 V		0.001	0.1			0.1			0.1	
V <sub>OL</sub>	Low-level output			6 V		0.001	0.1			0.1			0.1	v
OL	voltage	V <sub>IL</sub>	I <sub>OL</sub> = 4 mA	4.5 V		0.17	0.26			0.33			0.4	•
			I <sub>OL</sub> = 5.2 mA	6 V		0.15	0.26			0.33			0.4	
I	Input leakage current	V <sub>I</sub> = V <sub>CC</sub> or		6 V			±0.1			±1			±1	μA
I <sub>CC</sub>	Supply current	V <sub>I</sub> = V <sub>CC</sub> or 0	I <sub>O</sub> = 0	6 V			2			20			40	μA
Ci	Input capacitance			2 V to 6 V		3	10			10			10	pF

## 5.7 Switching Characteristics - 74

over operating free-air temperature range (unless otherwise noted)

					Operating free-air temperature (T <sub>A</sub> )									
	PARAMETER		то	V <sub>cc</sub>		25°C		-40°	°C to 8	5°C	-55°C	C to 12	5°C	UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
				2 V		50	100			125			150	
t <sub>pd</sub>	Propagation delay	A or B		4.5 V		10	20			25			30	ns
				6 V		8	17			24			25	
				2 V		38	75			95			110	
t <sub>t</sub>	Transition-time			4.5 V		8	15			19			22	ns
				6 V		6	13			16			19	

## 5.8 Switching Characteristics - 54

over operating free-air temperature range; typical values measured at TA = 25°C (unless otherwise noted).

			TO V <sub>cc</sub>		Operating free-air temperature (T <sub>A</sub> )									
	PARAMETER			то		25°C			-40°C to 85°C			-55°C to 125°C		
					MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
				2 V		50	100			125			150	
t <sub>pd</sub>	Propagation delay	A or B	or B Y	4.5 V		10	20			25			30	ns
				6 V		8	17			24			25	
	Transition-time			2 V		38	75			95			110	
t <sub>t</sub>			Y	4.5 V		8	15			19			22	ns
				6 V		6	13			16			19	

Product Folder Links: SN74HC08 SN54HC08



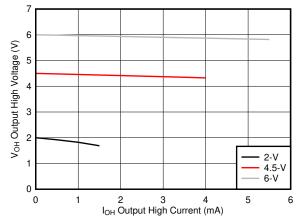
# **5.9 Operating Characteristics**

over operating free-air temperature range; typical values measured at T<sub>A</sub> = 25°C (unless otherwise noted).

	PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	MIN	TYP MAX	UNIT
Cpo	Power dissipation capacitance per gate	No load	2 V to 6 V		20	pF

## **5.10 Typical Characteristics**

 $T_A = 25^{\circ}C$ 



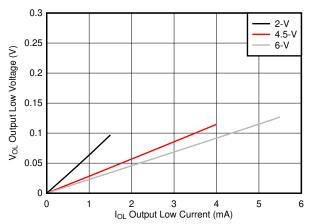


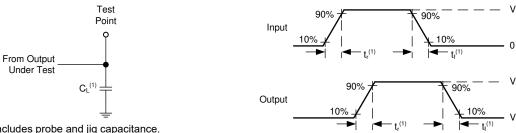
Figure 5-1. Typical output voltage in the high state  $(V_{OH})$ 

Figure 5-2. Typical output voltage in the low state  $(V_{OL})$ 



## **6 Parameter Measurement Information**

- Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR  $\leq$  1 MHz,  $Z_O$  = 50  $\Omega$ ,  $t_t$  < 6 ns.
- The outputs are measured one at a time, with one input transition per measurement.

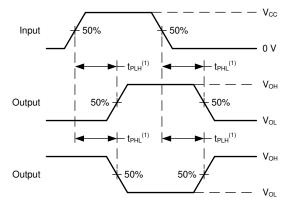


A.  $C_1 = 50$  pF and includes probe and jig capacitance.

Figure 6-1. Load Circuit

t<sub>t</sub> is the greater of t<sub>r</sub> and t<sub>f</sub>.

Figure 6-2. Voltage Waveforms Transition Times



The maximum between  $t_{\text{PLH}}$  and  $t_{\text{PHL}}$  is used for  $t_{\text{pd}}$ .

Figure 6-3. Voltage Waveforms Propagation Delays

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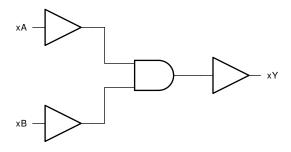


## 7 Detailed Description

#### 7.1 Overview

This device contains four independent 2-input AND gates. Each gate performs the Boolean function Y = A ● B in positive logic.

### 7.2 Functional Block Diagram



#### 7.3 Feature Description

#### 7.3.1 Balanced CMOS Push-Pull Outputs

A balanced output allows the device to sink and source similar currents. The drive capability of this device may create fast edges into light loads so routing and load conditions should be considered to prevent ringing. Additionally, the outputs of this device are capable of driving larger currents than the device can sustain without being damaged. It is important for the output power of the device to be limited to avoid damage due to over-current. The electrical and thermal limits defined in the *Absolute Maximum Ratings* must be followed at all times.

The SN74HC08 can drive a load with a total capacitance less than or equal to the maximum load listed in the *Electrical Characteristics - 74* connected to a high-impedance CMOS input while still meeting all of the datasheet specifications. Larger capacitive loads can be applied, however it is not recommended to exceed the provided load value. If larger capacitive loads are required, it is recommended to add a series resistor between the output and the capacitor to limit output current to the values given in the *Absolute Maximum Ratings*.

#### 7.3.2 Standard CMOS Inputs

Standard CMOS inputs are high impedance and are typically modeled as a resistor from the input to ground in parallel with the input capacitance given in the *Electrical Characteristics - 74*. The worst case resistance is calculated with the maximum input voltage, given in the *Absolute Maximum Ratings*, and the maximum input leakage current, given in the *Electrical Characteristics - 74*, using ohm's law  $(R = V \div I)$ .

Signals applied to the inputs need to have fast edge rates, as defined by the input transition time in the *Recommended Operating Conditions* to avoid excessive current consumption and oscillations. If a slow or noisy input signal is required, a device with a Schmitt-trigger input should be used to condition the input signal prior to the standard CMOS input.

### 7.3.3 Clamp Diode Structure

The inputs and outputs to this device have both positive and negative clamping diodes as depicted in Figure 7-1.

#### **CAUTION**

Voltages beyond the values specified in the Absolute Maximum Ratings table can cause damage to the device. The recommended input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

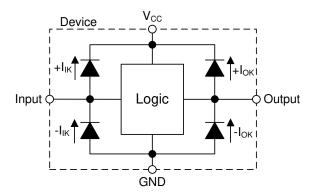


Figure 7-1. Electrical Placement of Clamping Diodes for Each Input and Output

### 7.4 Device Functional Modes

**Table 7-1. Function Table** 

INP	UTS	OUTPUT				
Α	В	Y				
Н	Н	Н				
L	X	L				
X	L	L				

Product Folder Links: SN74HC08 SN54HC08



## 8 Application and Implementation

#### Note

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes, as well as validating and testing their design implementation to confirm system functionality.

#### 8.1 Application Information

In this application, three 2-input AND gates are combined to produce a 4-input AND gate function as shown in *Figure 8-1*. The fourth gate can be used for another application in the system, or the inputs can be grounded and the channel left unused.

This device is used to directly control the RESET pin of a motor controller. The controller requires four input signals to all be HIGH before being enabled, and should be disabled in the event that any one signal goes LOW. The 4-input AND gate function combines the four individual reset signals into a single active-low reset signal.

### 8.2 Typical Application

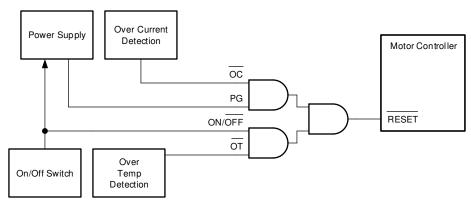


Figure 8-1. Typical application schematic

#### 8.2.1 Design Requirements

#### 8.2.1.1 Power Considerations

Ensure the desired supply voltage is within the range specified in the *Recommended Operating Conditions*. The supply voltage sets the device's electrical characteristics as described in the *Electrical Characteristics - 74*.

The supply must be capable of sourcing current equal to the total current to be sourced by all outputs of the SN74HC08 plus the maximum supply current,  $I_{CC}$ , listed in the *Electrical Characteristics - 74*. The logic device can only source or sink as much current as it is provided at the supply and ground pins, respectively. Be sure not to exceed the maximum total current through GND or  $V_{CC}$  listed in the *Absolute Maximum Ratings*.

Total power consumption can be calculated using the information provided in CMOS Power Consumption and  $C_{pd}$  Calculation.

Thermal increase can be calculated using the information provided in Thermal Characteristics of Standard Linear and Logic (SLL) Packages and Devices.

#### **CAUTION**

The maximum junction temperature, T<sub>J</sub>(max) listed in the *Absolute Maximum Ratings*, is an *additional limitation* to prevent damage to the device. Do not violate any values listed in the *Absolute Maximum Ratings*. These limits are provided to prevent damage to the device.

#### 8.2.1.2 Input Considerations

Unused inputs must be terminated to either  $V_{CC}$  or ground. These can be directly terminated if the input is completely unused, or they can be connected with a pull-up or pull-down resistor if the input is to be used sometimes, but not always. A pull-up resistor is used for a default state of HIGH, and a pull-down resistor is used for a default state of LOW. The resistor size is limited by drive current of the controller, leakage current into the SN74HC08, as specified in the *Electrical Characteristics - 74*, and the desired input transition rate. A 10-k $\Omega$  resistor value is often used due to these factors.

The SN74HC08 has standard CMOS inputs, so input signal edge rates cannot be slow. Slow input edge rates can cause oscillations and damaging shoot-through current. The recommended rates are defined in the *Recommended Operating Conditions*.

Refer to Section 7.3 for additional information regarding the inputs for this device.

#### 8.2.1.3 Output Considerations

The positive supply voltage is used to produce the output HIGH voltage. Drawing current from the output will decrease the output voltage as specified by the  $V_{OH}$  specification in the *Electrical Characteristics - 74*. Similarly, the ground voltage is used to produce the output LOW voltage. Sinking current into the output will increase the output voltage as specified by the  $V_{OL}$  specification in the *Electrical Characteristics - 74*.

Unused outputs can be left floating. Do not connect outputs directly to V<sub>CC</sub> or ground.

Refer to Section 7.3 for additional information regarding the outputs for this device.

#### 8.2.2 Detailed Design Procedure

- Add a decoupling capacitor from V<sub>CC</sub> to GND. The capacitor needs to be placed physically close to the device and electrically close to both the V<sub>CC</sub> and GND pins. An example layout is shown in Section 8.4.
- 2. Ensure the capacitive load at the output is ≤ 70 pF. This is not a hard limit, however it will ensure optimal performance. This can be accomplished by providing short, appropriately sized traces from the SN74HC08 to the receiving device.
- 3. Ensure the resistive load at the output is larger than  $(V_{CC} / I_O(max)) \Omega$ . This will ensure that the maximum output current from the *Absolute Maximum Ratings* is not violated. Most CMOS inputs have a resistive load measured in megaohms; much larger than the minimum calculated above.
- 4. Thermal issues are rarely a concern for logic gates, however the power consumption and thermal increase can be calculated using the steps provided in the application report, CMOS Power Consumption and Cpd Calculation

#### 8.2.3 Application Curves

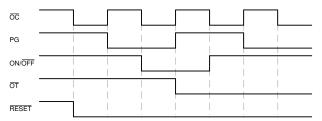


Figure 8-2. Typical application timing diagram

#### 8.3 Power Supply Recommendations

The power supply can be any voltage between the minimum and maximum supply voltage rating located in the *Recommended Operating Conditions*. Each  $V_{CC}$  terminal should have a bypass capacitor to prevent power disturbance. A 0.1- $\mu$ F capacitor is recommended for this device. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. The 0.1- $\mu$ F and 1- $\mu$ F capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for best results, as shown in *Figure 8-3*.

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#### 8.4 Layout

#### 8.4.1 Layout Guidelines

When using multiple-input and multiple-channel logic devices inputs must not ever be left floating. In many cases, functions or parts of functions of digital logic devices are unused; for example, when only two inputs of a triple-input AND gate are used. Such unused input pins must not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. All unused inputs of digital logic devices must be connected to a logic high or logic low voltage, as defined by the input voltage specifications, to prevent them from floating. The logic level that must be applied to any particular unused input depends on the function of the device. Generally, the inputs are tied to GND or  $V_{CC}$ , whichever makes more sense for the logic function or is more convenient.

#### 8.4.2 Layout Example

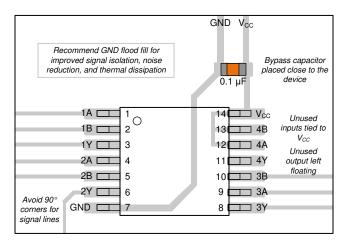


Figure 8-3. Example layout for the SN74HC08

## 9 Device and Documentation Support

#### 9.1 Documentation Support

#### 9.1.1 Related Documentation

For related documentation see the following:

- HCMOS Design Considerations
- CMOS Power Consumption and CPD Calculation
- · Designing with Logic

#### 9.2 Support Resources

TI E2E<sup>™</sup> support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's Terms of Use.

#### 9.3 Trademarks

TI E2E<sup>™</sup> is a trademark of Texas Instruments.

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#### 9.4 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

#### 9.5 Glossary

TI Glossary

This glossary lists and explains terms, acronyms, and definitions.

#### 10 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

## 

### 11 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

Product Folder Links: SN74HC08 SN54HC08

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31-Oct-2025

## **PACKAGING INFORMATION**

Orderable part number	Status (1)	Material type	Package   Pins	Package qty   Carrier	<b>RoHS</b> (3)	Lead finish/ Ball material	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
5962-8404701VCA	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8404701VC A SNV54HC08J
5962-8404701VCA.A	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8404701VC A SNV54HC08J
5962-8404701VDA	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8404701VD A SNV54HC08W
5962-8404701VDA.A	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8404701VD A SNV54HC08W
84047012A	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	84047012A SNJ54HC 08FK
8404701CA	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8404701CA SNJ54HC08J
8404701DA	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8404701DA SNJ54HC08W
JM38510/65203B2A	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65203B2A
JM38510/65203B2A.A	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65203B2A
JM38510/65203BCA	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65203BCA
JM38510/65203BCA.A	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65203BCA
JM38510/65203BDA	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65203BDA
JM38510/65203BDA.A	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65203BDA
M38510/65203B2A	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65203B2A





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Orderable part number	Status (1)	Material type	Package   Pins	Package qty   Carrier	<b>RoHS</b> (3)	Lead finish/ Ball material	MSL rating/ Peak reflow	Op temp (°C)	Part marking (6)
M38510/65203BCA	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65203BCA
M38510/65203BDA	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65203BDA
SN54HC08J	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54HC08J
SN54HC08J.A	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54HC08J
SN74HC08D	Obsolete	Production	SOIC (D)   14	-	-	Call TI	Call TI	-40 to 85	HC08
SN74HC08DBR	Active	Production	SSOP (DB)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC08
SN74HC08DBR.A	Active	Production	SSOP (DB)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC08
SN74HC08DR	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU   SN	Level-1-260C-UNLIM	-40 to 85	HC08
SN74HC08DR.A	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC08
SN74HC08DRG4	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HC08
SN74HC08DRG4.A	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC08
SN74HC08DT	Obsolete	Production	SOIC (D)   14	-	-	Call TI	Call TI	-40 to 85	HC08
SN74HC08N	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74HC08N
SN74HC08N.A	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74HC08N
SN74HC08NE4	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74HC08N
SN74HC08NSR	Active	Production	SOP (NS)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC08
SN74HC08NSR.A	Active	Production	SOP (NS)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC08
SN74HC08PW	Obsolete	Production	TSSOP (PW)   14	-	-	Call TI	Call TI	-40 to 85	HC08
SN74HC08PWR	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU   SN	Level-1-260C-UNLIM	-40 to 85	HC08
SN74HC08PWR.A	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC08
SN74HC08PWRG4	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC08
SN74HC08PWRG4.A	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC08
SN74HC08PWT	Obsolete	Production	TSSOP (PW)   14	-	-	Call TI	Call TI	-40 to 85	HC08
SNJ54HC08FK	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	84047012A SNJ54HC 08FK
SNJ54HC08FK.A	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	84047012A SNJ54HC 08FK



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Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	<b>RoHS</b> (3)	Lead finish/ Ball material	MSL rating/ Peak reflow	Op temp (°C)	Part marking (6)
						(4)	(5)		
SNJ54HC08J	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8404701CA SNJ54HC08J
SNJ54HC08J.A	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8404701CA SNJ54HC08J
SNJ54HC08W	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8404701DA SNJ54HC08W
SNJ54HC08W.A	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8404701DA SNJ54HC08W

<sup>(1)</sup> Status: For more details on status, see our product life cycle.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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<sup>(2)</sup> Material type: When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

<sup>(3)</sup> RoHS values: Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

<sup>(4)</sup> Lead finish/Ball material: Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

<sup>(5)</sup> MSL rating/Peak reflow: The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

<sup>(6)</sup> Part marking: There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.



## **PACKAGE OPTION ADDENDUM**



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#### OTHER QUALIFIED VERSIONS OF SN54HC08, SN54HC08-SP, SN74HC08:

• Catalog : SN74HC08, SN54HC08

• Automotive : SN74HC08-Q1, SN74HC08-Q1

Military: SN54HC08

• Space : SN54HC08-SP

#### NOTE: Qualified Version Definitions:

- Catalog TI's standard catalog product
- Automotive Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Military QML certified for Military and Defense Applications
- Space Radiation tolerant, ceramic packaging and qualified for use in Space-based application



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### TAPE AND REEL INFORMATION





A0	Dimension designed to accommodate the component width
В0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

#### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



#### \*All dimensions are nominal

Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74HC08DBR	SSOP	DB	14	2000	330.0	16.4	8.35	6.6	2.4	12.0	16.0	Q1
SN74HC08DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HC08DRG4	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HC08NSR	SOP	NS	14	2000	330.0	16.4	8.45	10.55	2.5	12.0	16.2	Q1
SN74HC08PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74HC08PWRG4	TSSOP	PW	14	2000	330.0	12.4	6.9	5.3	1.6	8.0	12.0	Q1
SN74HC08PWRG4	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1



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### \*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74HC08DBR	SSOP	DB	14	2000	353.0	353.0	32.0
SN74HC08DR	SOIC	D	14	2500	340.5	336.1	32.0
SN74HC08DRG4	SOIC	D	14	2500	340.5	336.1	32.0
SN74HC08NSR	SOP	NS	14	2000	353.0	353.0	32.0
SN74HC08PWR	TSSOP	PW	14	2000	356.0	356.0	35.0
SN74HC08PWRG4	TSSOP	PW	14	2000	367.0	367.0	35.0
SN74HC08PWRG4	TSSOP	PW	14	2000	353.0	353.0	32.0



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### **TUBE**



#### \*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
5962-8404701VDA	W	CFP	14	25	506.98	26.16	6220	NA
5962-8404701VDA.A	W	CFP	14	25	506.98	26.16	6220	NA
84047012A	FK	LCCC	20	55	506.98	12.06	2030	NA
8404701DA	W	CFP	14	25	506.98	26.16	6220	NA
JM38510/65203B2A	FK	LCCC	20	55	506.98	12.06	2030	NA
JM38510/65203B2A.A	FK	LCCC	20	55	506.98	12.06	2030	NA
JM38510/65203BDA	W	CFP	14	25	506.98	26.16	6220	NA
JM38510/65203BDA.A	W	CFP	14	25	506.98	26.16	6220	NA
M38510/65203B2A	FK	LCCC	20	55	506.98	12.06	2030	NA
M38510/65203BDA	W	CFP	14	25	506.98	26.16	6220	NA
SN74HC08N	N	PDIP	14	25	506	13.97	11230	4.32
SN74HC08N	N	PDIP	14	25	506	13.97	11230	4.32
SN74HC08N.A	N	PDIP	14	25	506	13.97	11230	4.32
SN74HC08N.A	N	PDIP	14	25	506	13.97	11230	4.32
SN74HC08NE4	N	PDIP	14	25	506	13.97	11230	4.32
SN74HC08NE4	N	PDIP	14	25	506	13.97	11230	4.32
SNJ54HC08FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54HC08FK.A	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54HC08W	W	CFP	14	25	506.98	26.16	6220	NA
SNJ54HC08W.A	W	CFP	14	25	506.98	26.16	6220	NA

# W (R-GDFP-F14)

## CERAMIC DUAL FLATPACK



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only.
- E. Falls within MIL STD 1835 GDFP1-F14







#### NOTES:

- 1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.

  2. This drawing is subject to change without notice.

  3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not
- exceed 0.15 mm per side.
  4. Reference JEDEC registration MO-150.





NOTES: (continued)

- 5. Publication IPC-7351 may have alternate designs.
- 6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.





NOTES: (continued)

- 7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
- 8. Board assembly site may have different recommendations for stencil design.



8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

This image is a representation of the package family, actual package may vary. Refer to the product data sheet for package details.



**INSTRUMENTS** www.ti.com

CERAMIC DUAL IN LINE PACKAGE



Images above are just a representation of the package family, actual package may vary. Refer to the product data sheet for package details.

4040083-5/G





CERAMIC DUAL IN LINE PACKAGE



#### NOTES:

- 1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
- 2. This drawing is subject to change without notice.
- 3. This package is hermitically sealed with a ceramic lid using glass frit.
- His package is remitted by sealed with a ceramic its using glass mit.
   Index point is provided on cap for terminal identification only and on press ceramic glass frit seal only.
   Falls within MIL-STD-1835 and GDIP1-T14.



CERAMIC DUAL IN LINE PACKAGE



# N (R-PDIP-T\*\*)

## PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.







#### NOTES:

- 1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.

  2. This drawing is subject to change without notice.

  3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not
- exceed 0.15 mm per side.
- 4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
- 5. Reference JEDEC registration MO-153.





NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.





NOTES: (continued)

- 8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
- 9. Board assembly site may have different recommendations for stencil design.





SMALL OUTLINE INTEGRATED CIRCUIT



#### NOTES:

- 1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.

  2. This drawing is subject to change without notice.

  3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not
- exceed 0.15 mm, per side.
- 4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm, per side.
- 5. Reference JEDEC registration MS-012, variation AB.



SMALL OUTLINE INTEGRATED CIRCUIT



NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



SMALL OUTLINE INTEGRATED CIRCUIT



NOTES: (continued)

- 8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
- 9. Board assembly site may have different recommendations for stencil design.



## **MECHANICAL DATA**

## NS (R-PDSO-G\*\*)

# 14-PINS SHOWN

### PLASTIC SMALL-OUTLINE PACKAGE



NOTES:

- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



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Last updated 10/2025